California was a leader in compensation laws to protect the worker. The State, therefore, may well be one of the first to protect industry and the employer!

384 Post Street.

DISCUSSION

HOWARD E. RUGGLES, M. D. (384 Post Street, San Francisco).—From the x-ray standpoint, an ideal arrangement would be to secure at least one film of every individual before his employment in a dusty occupation. A man with evidence of an old or latent tuberculosis should, of course, be excluded from any such occupation. Practically, this ideal is unattainable, at least at the present time, but employers and insurance companies would find that a roentgenological survey of employees subject to dust hazard, once in three to five years, would more than repay the expense incurred.

As in so many other conditions, the earliest stages of silicosis give no characteristic roentgen picture. The first recognizable evidence of the disease is an enlargement of the hilar shadows and a thickening of the bronchial markings, particularly those toward the bases of the lungs and posteriorly. There next appears a variable amount of pleural thickening, followed by the development of the characteristic silicotic nodules in both lung fields. These are rounded areas of increased density, 3 to 5 millimeters in diameter, with hazy margins, usually scattered fairly symmetrically in the lung fields, particularly in the posterior halves. With continued exposure, these nodules enlarge and coalesce, as the result of a progressive fibrosis. The process ends in a terminal tuberculosis or, less commonly, cardiac failure, due to interference with the lung circulation. In many cases where films of the individual are not available until the later stages of the disease, it is difficult to decide how much of the fibrosis present is due to the underlying silicosis, and how much to the secondary tuberculosis. Earlier films in such cases would be invaluable.

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SIDNEY J. SHIPMAN, M. D. (490 Post Street, San Francisco).—Doctor Behneman has written a timely and comprehensive analysis of the silicosis problem. Fortunately, the importance of this disease is now generally recognized. The means of prevention are fairly well understood, and the outlook, therefore, much brighter than it has been at any time in the past. The fact that silicosis is *per se* one of the purely industrial diseases and, therefore, involves a pecuniary factor of great importance, has no doubt greatly accelerated its study and prevention.

There are one or two minor points in Doctor Behneman's paper which, while not highly important, might be open to argument; whether, for example, the etiology of the pulmonary injury is not traumatic or mechanical, but a chemical assault, might be questioned. There are still those who believe that the mechanical factor is not unimportant.

In discussing the importance of tuberculosis as a complicating factor of silicosis, Doctor Behneman does well to point out that most silicosis victims sooner or later develop tuberculosis. The importance of this observation emphasizes the necessity for adequate antituberculosis measures in communities where the silicosis hazard is high, as in the Mother Lode district of California. The California Tuberculosis Association has recognized this field as a new arena for concentrated endeavor, and it is to be hoped that the measures now in use for the prevention of tuberculous infection and disease will be applied more intensively in the future in these communities.

The other methods of prevention, in the occupational sense, have been adequately described by Doctor Behneman. The various measures for eliminating dangerous concentrations of dust particles are, of course, highly important, although in this connection it is somewhat questionable whether respirators really furnish much protection, or whether they merely give a false sense of security and thus lead to abuses. As far as periodic examinations are concerned, there seems to be a perfectly understandable but, from the medical standpoint, unjustifiable opposition on the part of labor unions. These unions must be won over to the medical viewpoint by proper education, when I feel sure their enthusiastic coöperation can be enlisted.

As Pierson has repeatedly pointed out, what we need in California is an impartial silicosis commission or silicosis institute, probably connected with one of the large universities, for the purpose of studying the problem as it affects California, and furnishing impartial advice and testimony wherever needed.

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# THE SO-CALLED "STRADDLE" INJURY: ITS MANAGEMENT*†

*By* EDWARD W. BEACH, M. D.
*Sacramento*

DISCUSSION *by Thomas E. Gibson, M. D., San Francisco; Jay J. Crane, M. D., Los Angeles.*

IT was Plato who said, "All science is but remembrance," and we seek herein remembrance and recapitulation of certain basic facts with regard to this type of injury rather than the promulgation of any novelty or innovation.

## REASONS FOR THIS ARTICLE

The reasons for this article are several, all of which seem important to us.

1. These straddle injuries are fairly common in industrial practice. They should, therefore, interest the surgeon to whom the unfortunate man first applies; the urologist who may be called because the urethra is frequently involved; and last, but not least, the insurance carriers, because they pay the bills.

2. There is little to be found in standard textbooks concerning these straddle injuries, and this little is handled in rather a perfunctory and empirical manner. Usually no attempt is made to rationalize their treatment. Elaborate embroidery patterns for urethral anastomosis are artistically demonstrated and often advised under these circumstances, which makes one with experience conclude that many of these cases were purely hypothetical, and treated in the "mind's eye" rather than at the bedside.

3. It has been our observation that many otherwise most excellent surgeons view this type of injury askance and with a commingling of awe and horror somewhat akin to Magellan's feelings when he first beheld the Southern Cross in navigation of the equatorial zone. This may be a tribute to enthusiastic urologic propaganda, but at any rate the male urethral perineum is still hallowed ground for most general surgeons in point of fact, and occupies with them about the same status today as in the era of the Collots. Taken all in all, perhaps no injury is viewed by them with more consternation, foreboding, perplexity and uncertainty than one which occurs in the urethral perineum in the male.

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* Read before the Urology Section of the California Medical Association at the sixty-fifth annual session, Coronado, May 25-28, 1936.

† An apology is due the strict grammarian for our legerdemain with the word "straddle." To assume this license in a scientific article is, doubtless, reprehensible. However, for the surgical mind the erstwhile adjective "straddle" has a deeper and different connotation. It represents a concise, graphic and descriptive, if somewhat loose and ungrammatical, method of grouping a common industrial accident. Moreover, frequent technical application in this connection has liberalized and almost standardized this grammatical error in this way among the profession.

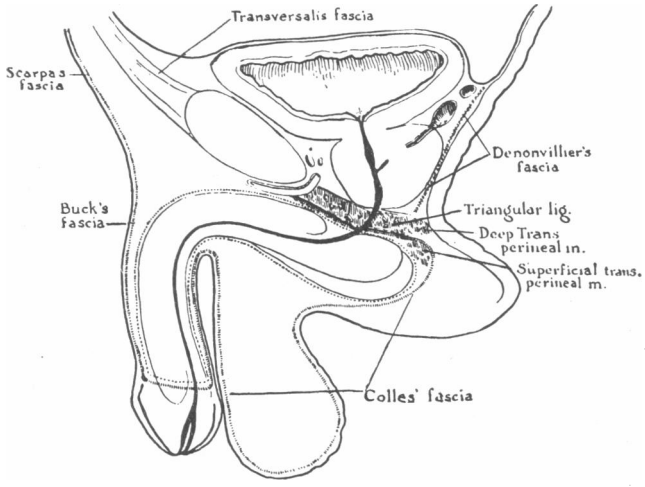



Fig. 1

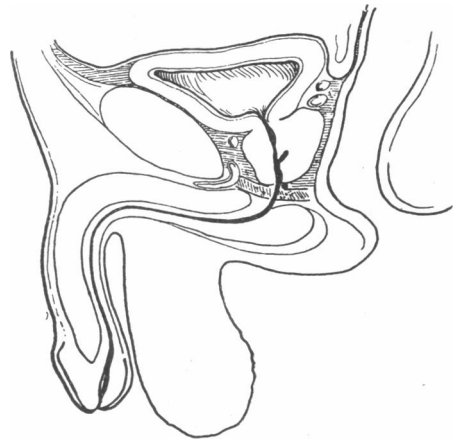


Fig. 2

Fig. 1.—Fasciae of importance in urinary extravasation (after Wesson). Colles's fascia is concerned in nearly all extravasations and its abdominal continuation. Scarpa's fascia is less frequently involved. Intrapelvic extravasations are least commonly observed.

Fig. 2.—When extravasation originates on the pelvic side of the triangular ligament, retroprostatic, perirectal and ischiorectal infiltrations are most commonly observed, although perivesical involvement may occur.

4. We, therefore, seek to review and clarify this subject in a practical way, hoping to dispel some of this mysticism anent the perineum and injuries therein.

5. Finally, it has been our good fortune to have treated a number of these straddle cases. We have adduced, from their care at the bedside, certain principles which have helped us. We will attempt to set forth these principles, with a hope that they may help others also.

## ANATOMIC FACTORS

### *Site of Injuries.*

From the standpoint of mechanics, when an individual falls astride a flat, unyielding surface such as a timber, the soft tissues and urethra of the perineum are commonly pinched between the timber below and the undersurface of the pubic arch, or the transverse ligament above.

In such an accident, with the force applied more or less at right angles to the perineal surface, the bulbar urethra is seldom injured, although it is nearest the surface, most exposed in position and relatively extensive in spread. From an anatomical standpoint (Drawing A), it is seen that the urethral lumen traverses the bulbar expansion in such a way that approximately two-thirds of the surrounding erectile tissue is beneath the urethra itself, or between the latter and the perineum. This tissue acts as a cushion, therefore, to the urethra. Moreover, the bulbocavernosus muscle likewise furnishes additional protection to the bulb itself.

Thus, when the perineum receives a sharp blow or is subjected to a crushing force (as in a fall astride a broad, immobile surface), these anatomical bulwarks usually render the bulbar urethra immune. Instead, by virtue of that dense fascial sheath, the superficial layer of the triangular ligament, this force is transmitted to and brought to bear upon the weaker and unfortified abutting membranous structure, *i. e.*, the terminal or distal membranous urethra. Furthermore, this terminal membranous urethra invites injury because of its unusually thin-walled structure and its relatively fixed position in close proximity to the pubis and ischium. A point of great practical importance in this connection is that since most strictures are located in or near the bulb, this natural thinness of the membranous structure is enormously enhanced by the dilatation behind such an impediment and its vulnerability to trauma proportionately increased. For these reasons, therefore, partial rupture often accrues in the distal membranous urethra in the ordinary type of straddle accident, and in our experience the floor is most often involved, leaving the roof intact.

There is now a second and distinctly different type of injury which primarily implicates the bulb. Force of a tangential nature is brought to bear upon this structure either from the side or more often from the rear. Because of this violence the bulb is dislocated or torn from its attachments to the triangular ligament and thrust forward often over the anterior surface of the pubis, which ordinarily assumes an angle of about 30 degrees with the horizontal. In this mechanism avulsion or complete rupture of the urethra transpires again in this distal membranous structure or in the immediate vicinity.

### *Extravasation Possibilities.*

The practical surgeon, with regard to extravasation, considers the urethral perineum like Caesar's Gaul—to be divided into three parts, to wit: (1) territory within the superficial perineal interspace; (2) territory between the inferior and superior layers of the triangular ligament or urogenital diaphragm; and (3) territory above or proximal to the superior layer of the triangular ligament. For completeness, it is also necessary to take cognizance of a fourth territory concerned more often with rupture of the pendulous urethra, namely, extravasation between the layers of Buck's fascia. In certain instances when urethral rupture

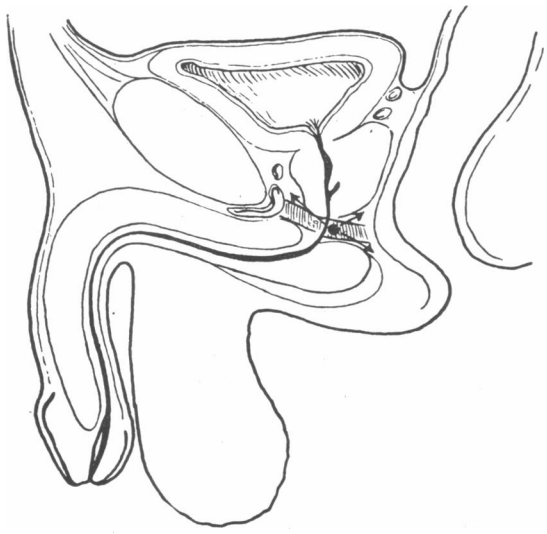


Fig. 3

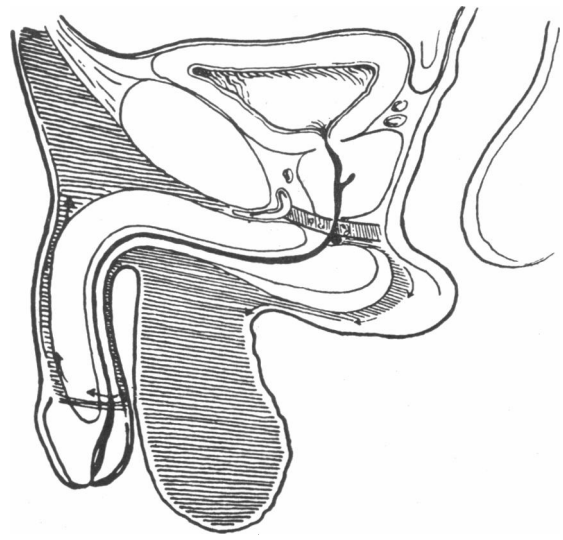


Fig. 4

Fig. 3.—If extravasation originates within the triangular ligament, extension occurs in either direction, most often externally.

Fig. 4.—Spread of extravasation when primary focal lesion is anterior to the triangular ligament. A course bounded by Colles's and Scarpa's fasciae is pursued.

occurs at the root of the penis within the sheath of the corpus cavernosum, the advancing extravasation is confined to very narrow limits by a special fascia. This fascia, as described by Buck, is a membranous sheath completely encompassing the corpus cavernosum, and taking its origin above and behind from the suspensory ligament and below from the perineal fascia. It invests the corpus cavernosum closely and is bound to the corpus spongiosum above by two reflections, one of which passes above the latter and the other beneath.

The superficial perineal interspace holds the most interest for the straddle surgeon. It will be recalled that the vulnerable portion of the membranous urethra (the distal portion) lies in this interspace. Extravasation here cannot go upward because of the dense inferior diaphragmatic fascia, nor can it go backward into the ischiorectal region because of the deep layer of the superficial fascia (Colles's), which fuses with the former at the base. Moreover, the extravasation cannot spread into the thighs, because both the inferior ligament and Colles's fascia attach laterally to the pubo-ischiatic rami. Hence, the tumefaction confined beneath Colles's fascia tends to advance forward over the perineoscrotal angle into the scrotum, and later up over the pubes.

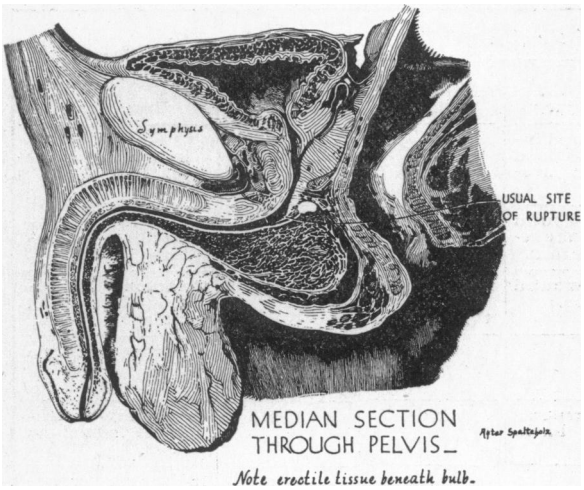
That portion of the membranous urethra between the inferior and superior layers of the triangular ligament is sometimes involved in these straddle injuries, and particularly by puncture wounds. Should accumulation take place here it remains confined for a time, and then may slough through either ligament, *i. e.*, down into the superficial perineal interspace or up into the territory above the deep layer of the triangular ligament. However, any extravasation proximal to the superficial layer of the triangular ligament may seep backward into the ischiorectal region and buttocks or into the thighs.

The territory above the superior layer of the triangular ligament is seldom concerned in these accidents save by puncture wounds. In these cases the extravasation is held forward by Denonvillier's fascia and often, by pushing up the peritoneum from the bladder, passes into the cave of Retzius. In two puncture cases involving the deep urethra (these may have involved the proximal membranous structure with rupture of the deep triangular ligament), in this series we found perhaps a quart of blood and urine in this area while performing cystotomy. On the other hand, the extravasation may at times extend retroperitoneally up to the diaphragm.

## CLINICAL MATERIAL

This article is based on sixteen of these straddle injuries seen by the author in the last twelve years of practice. Many were seen in consultation at small hospitals in northern California. Several were seen at the Jones Memorial Hospital in Grass Valley, among gold miners, through the courtesy of Doctors Carl Power Jones and Walker Reed. For others the author is beholden to his surgical brethren in the peripheral area and to the insurance carriers. It is well to remember in this connection that the urologist is consulted only in the complicated and more difficult cases.

The oldest man in this series was fifty-six and the youngest, fourteen. Most were husky workers in the prime of life. Nearly every sort of object was straddled, viz., a bench support, a stepladder, a fence, a curb, a stump, a rock, a steel rail, but most often a piece of timber used as a brace in the mines. The mechanics of the accident remained virtually the same throughout. Variants involved (*a*) the distance fallen, and (*b*) the contacting surface. (*a*) The distance fallen was difficult to estimate in many cases. The shortest distance was approximately two feet, and the longest




Drawing A

almost twenty feet. The distance dropped offered no index as to the urethral lesion except in the broadest possible sense. In two stricture cases the fall was trivial, while in the longest drop little urethral damage accrued. (*b*) Contact was most often with broad or blunt surfaces—therefore, the twelve closed cases in this series as opposed to the four puncture or open cases. None of the latter involved the rectum.

ANALYSIS OF THE CLINICAL MATERIAL

Under this caption subheadings have been arranged for convenience and simplicity, and whenever possible appropriate deductions made.

1. *Urethral Injury.*

These injuries comprised three general groups: (*a*) partial rupture on the floor of the distal membranous structure of which there were eight cases; (*b*) complete urethral rupture often by tearing loose the bulb from its fixed position of which there were four cases; and (*c*) four puncture wounds, of which one involved the membranous urethra, one the bulb directly, and two either the proximal membranous urethra or the distal prostatic urethra. The exact nature of the urethral lesion was difficult to estimate; but when catheterization was possible it was assumed that the rupture was incomplete.

2. *Preëxisting Urethral Strictures.*

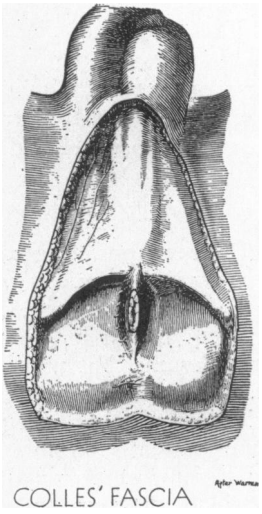
Incidentally, two men in this series had a penile hypospadias. Seven of these sixteen cases presented evidence of stricture. The high incidence of the latter finds explanation both in the great prevalence of this fibrous legacy, and as to its pertinent application from an anatomical standpoint. Moreover, most strictures are ineffectually and inadequately treated because of the sufferer's attitude, which may be crystallized thus: "The devil was sick, the devil a monk would be; the devil was well, the devil a monk was he." Most of these individuals quickly acquire this disposition to avoid treatment, from which nothing can dislodge them except another attack of acute urinary retention.

3. *Urinary Retention.*

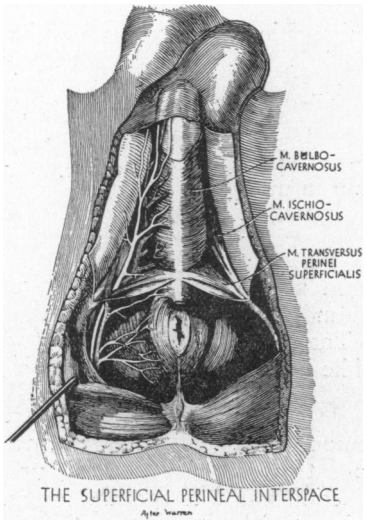
Only five of these patients were able to void spontaneously after the accident. Three refused subsequent treatment after catheterization, and two returned a few days later with urinary extravasation. Moreover, the author has seen three other patients who presented the clinical picture of urethral rupture, but refused examination because they were able to void without difficulty, and one later developed extravasation. It is, therefore, our conviction that when the urethra is injured and there is broken continuity, the act of voiding by reason of the vis a tergo forces the urine out into the tissues and favors extravasation.

4. *Perineal Appearance.*

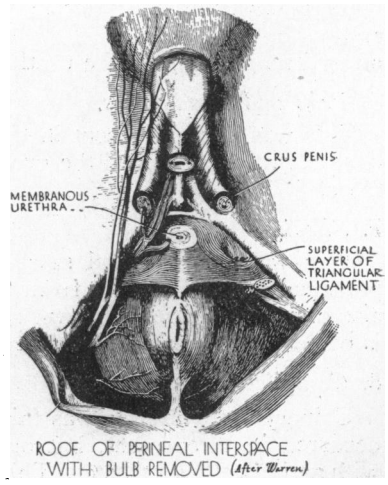
This ranged from slight ecchymosis to a large hematoma, but offered no exact criterion as to the urethral lesion. Only slight ecchymosis (particularly in stricture cases) may accompany a badly ruptured urethra. Many times the swelling in the perineum is extraordinary. In these cases the region about the vascular bulb is traumatized so that blood is poured out beneath Colles's fascia. This




Drawing B




Drawing C




Drawing D

TABLE 1.—*A Résumé of the Clinical Material*

| Initials | Nature of Accident | Catheterization | Type of Injury | Preëxisting Stricture | Urinary Retention | Treatment |
|---|---|---|---|---|---|---|
| M. B. | Caught in steam shovel, dropped astride sharp rock. | Impossible | Puncture wound involving proximal membranous urethra. | No | Yes | Cystotomy — later indwelling catheter. |
| C. B. | Slid down telephone pole, astride iron rung. | Impossible | Puncture wound proximal membranous urethra. | No | Yes | Cystotomy—indwelling catheter. |
| G. D. | Tumbled off cultivator, astride spiked wheel. | Impossible | Puncture wound membranous. | Penile hypospadias tight orifice | Yes | Cystotomy—retrograde indwelling later. |
| C. O. | In garage pit, astride bench support. | Impossible | Complete. | No | Yes | External urethrotomy. |
| P. P. | Astride timber brace in mine. | Impossible | Puncture wound involving bulb. Complete. | No | Yes | Cystotomy—retrograde indwelling later. |
| A. S. | Astride timber brace in mine. | Possible | Incomplete. | Yes | Yes | Indwelling catheter. |
| W. R. | Astride timber brace in mine. | Possible | Incomplete. | Yes | Yes | Indwelling catheter. |
| S. H. | Astride fence rail. | Possible | Incomplete. | No | No | Refused—subsequent extravasation. |
| G. V. | Astride stump from ladder. | Impossible | Complete. | Yes | Yes | External urethrotomy. |
| M. O. | Astride seat arm, in theater. | Impossible | Complete. | No Penile hypospadias No | Yes | External urethrotomy. |
| C. L. | Astride limb in tree-pruning. | Possible | Incomplete. | No | No | Indwelling catheter. |
| P. H. | Astride saddle horn, horse stumbled. | Possible | Incomplete. | Yes | Yes | Indwelling catheter. |
| S. G. | Astride steel rail | Impossible | Complete. | Yes | Yes | External urethrotomy. |
| W. W. | Astride curb. | Possible | Incomplete. | Yes | No | Refused; extravasation. |
| S. L. | Astride step ladder. | Possible | Incomplete. | Yes | No | Refused; no extravasation. |
| E. B. | Tumbled off garage astride fence. | Possible | Incomplete. | No | No | Indwelling catheter. |

hematoma effaces the perineoscrotal angle and swiftly advances into the scrotum. In other cases the scrotal tissues receive direct violence as part of the accident. These two confluent structures (the perineum and scrotum) then comprise a purplish mass extending nearly to the knees.

5. *Bleeding From the Penis.*

This was common, independent of micturition, and often persistent, but of small volume. It offered no index as to the urethral damage.

6. *Pain and Tenderness.*

This was always present in the perineum. Urinary retention provoked the greatest pain in most cases.

7. *Shock.*

This was greatest and most prolonged in the puncture cases. Bleeding from these wounds was also usually profuse, but never serious. The shock is often negligible in the ordinary straddle injury.

8. *Complications.*

Urinary extravasation was fairly common. This occurred in three cases, but only in one treated with an indwelling catheter. This tumefaction was promptly evacuated with a perineal incision, which sufficed for cure. In the other two cases an external urethrotomy was done and the bladder drained by means of a tube through the proximal urethral segment. Free incisions were made into the advancing mass. In one case the extravasation was very troublesome, advancing into the scrotum despite free incisions, and finally onto the abdomen just above the pubis. It is our belief that the final chapter with regard to extravasation in its various phases has never been written, although its behavior from an anatomical standpoint is quite clear. Four cases in this series also developed an epididymitis.

9. *Sequelae.*

The most common sequela was a post-traumatic stricture at the site of urethral injury. It was roughly proportionate to the original damage, and was least in the cases treated by an indwelling catheter. It was never troublesome, but required occasional dilatations consonant with the contracture speed, generally at brief intervals in the beginning and a matter of months later. Three of our external urethrotomy patients complained of temporary impotence, and in one it persisted for nearly twelve months.

## MANAGEMENT

### *Concerning Treatment.*

The fundamental objective is to divert the urine from the site of urethral injury and, incidentally, in many cases to relieve acute urinary retention. We have, therefore, three avenues of approach, used singly or in combination: (1) the catheter, (2) external urethrotomy, (3) cystotomy.

1. An indwelling catheter for seven to ten days is usually adequate for partial urethral rupture. It splints over the lacerated area and favors healing. The traumatic urethritis incident to the catheter does not appear to retard healing. A patient, dextrous and gentle attempt at catheterization should be made in every case before surgery is undertaken. It is often facilitated by anesthesia. If it is not successful, then surgery must be resorted to without delay.

### *Technique of Catheterization.*

Technical difficulties increase with lapsed time after the injury. Only a filiform is used at the outset because (*a*) many patients have preëxisting strictures in the penile urethra or about the bulb; (*b*) the bulbar urethra is often compressed, angulated, or displaced either by reason of the violence or contiguous hematoma or both; (*c*) the filiform hugs the roof better than other instruments; (*d*) and the filiform does not tend to increase the urethral laceration as a catheter nib or sound point might do. Once the filiform enters the bladder the rest is easy. This procedure is carried out under aseptic conditions, and then the catheter end is kept as sterile as possible. Five of our cases were successfully treated in this manner, with slight urinary extravasation in one.

2. An external urethrotomy is not always successful under these circumstances. With a large perineal hematoma it is best avoided, in our opinion, because of distortion, extravasated blood and altered anatomical landmarks. Moreover, the proximal urethral segment tends to retract particularly in the lithotomy position. The use of a filiform as a searcher and manually bringing the patient nearer a supine posture (lowering the legs and working beneath) after the exposure is made, have both helped us at times to discover the illusive upper segment. Once the proximal segment is located, the usual indwelling catheter is employed in the regular way. No attempt to suture the urethra was made by us, because in the dorsal decubitus the two ends come together anyway and healing appears just as rapid without the sutures. External urethrotomy was done four times in this series for the rupture and twice for extravasation developing later.

3. Cystotomy is the sheet anchor in all of these cases. This is especially true in puncture cases where the exact depth and extent of the wound is unknown. The urine should be drained a few days and then a secondary attempt made to pass the catheter in the regular manner or retrograde with the help of a perineal incision. Cystotomy was necessary in four of these cases. Twice we resorted to retrograde catheterization with the aid of a perineal incision. In the other two catheterization was easily done seven or eight days subsequently.

## CONCLUSIONS

Based upon our experience with these sixteen cases, we venture the following generalizations anent their management:

1. Every case of urethral rupture, whether partial or complete, should be hospitalized. This particularly concerns the gentleman who voids spontaneously after the accident, because he is the most difficult to handle and most often develops complications.

2. The truth with regard to treatment lies somewhere in the middle of the road between ultra-conservatism and meddlesome radicalism.

3. Each case is a law unto itself and must be handled accordingly.

4. Many partial ruptures when catheterization is possible do well with no complications on an indwelling catheter.

5. If catheterization (and it should be attempted) is impossible, surgery must be undertaken without delay.

6. Surgery should be bold and direct, but as simple as possible. Surgery devoid of fancy work, frills, and time-consuming maneuvers gave us the best end-results.

7. Surgery must not be too extensive at one session. Better to drain the urine and get out. After a few days of rest, one is agreeably surprised at the ease of subsequent accomplishments.

8. When sound surgical judgment is used, the results are gratifying and no group of patients more appreciative.

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## DISCUSSION

THOMAS E. GIBSON, M.D. (450 Sutter Street, San Francisco).—Straddle injuries fall into two clinical groups: (1) immediate and (2) late. Doctor Beach has clearly outlined the salient features of treatment with respect to the immediate group. Emphasis should be placed on strict asepsis in handling these cases. One should have as much respect for the urethra as for the peritoneum. It is not enough to cleanse the external genitalia, but in addition the anterior urethra should be thoroughly irrigated with an antiseptic solution before catheterization or instrumental manipulation. Measures taken to minimize infection will minimize the occurrence of peri-urethritis at the site of injury with resultant scar tissue proliferation and stricture formation, which is the bane of this type of injury. Great discretion is likewise necessary in the use of the indwelling catheter in these cases, because an indwelling catheter in any case produces urethritis. This may cause peri-urethritis at the site of injury, with an increased tendency to later stricture formation. If an indwelling catheter is used at all for splinting purposes, it should be for as short a time as possible, and a size 18 or 20 F. is recommended, rather than a 24 or 26 F. The more tightly the catheter fits the urethra the greater is the resultant urethritis. Doctor Beach's statement that an "attempt at catheterization should be made in every case before surgery is undertaken" is at variance with the opinion of several authorities. Garlock (1923) states that any case presenting the symptoms of inability to void, perineal hematoma, bladder distention and urethral bleeding should be considered an emergency, and operated upon as soon as possible. Perineal, scrotal or pelvic extravasation of urine, when not relieved with a reasonably short space of time, invariably becomes infected, to be followed in succession by necrosis, sloughing of the soft parts, spread-

ing of infection, grave sepsis, and death. This fact constitutes the strongest argument for early operation where rupture is suspected, or diagnosed with certainty. Under no condition should preliminary catheterization be attempted in the face of this syndrome, which is practically always accompanied by a complete or almost complete rupture of the urethra. Attempts at catheterization increase trauma, create false pockets in the perineum, cause fresh hemorrhage, introduce infection, and in some cases convert an incomplete to a complete tear. Furthermore, even though one succeeds in passing a catheter to the bladder under such conditions, the ultimate result after healing has occurred is generally stricture formation due to the intense peri-urethral infiltration and reaction. Stricture formation is what we desire especially to prevent, because once present it is generally vicious and may require operation later. In other words, Garlock feels that by not using the indwelling catheter the tendency to stricture formation is lessened. The procedure to be followed in these cases, then, is drainage of the perineum and suprapubic cystotomy, letting nature attend to the healing of the urethra. After the initial traumatic reaction has subsided it may then be advisable to use an indwelling catheter, provided the urethra does not close spontaneously.

Even though the original straddle injury has been so slight as to produce no actual rupture or tear in the urethra, the patient may experience stricture formation and even complete retention coming on weeks, months, or even years later. It is imperative, therefore, even in slight injuries which do not interfere with urination at the time, to have these patients report periodically for dilatation with sounds for a long time, thus obviating late stricture formation. Traumatic strictures are notoriously more resistant and difficult to deal with than strictures of gonorrheal origin. It is of interest, as Lowsley has pointed out, that many of these straddle-injury cases suffer the occurrence of sexual impotence.

The late cases, which are often seen as a result of inadequate early treatment (and sometimes in spite of adequate early treatment), offer serious problems which may tax the skill and resourcefulness of the urologist to the utmost. The chief problem of the late case, seen perhaps months or years after the original injury, is the management of stricture, which is generally of a most rigid and refractory type. An attack of complete retention of urine may be the presenting symptom which makes the patient seek urgent relief. Filiforms and followers are called into play, but if they cannot be passed, cystotomy or external urethrotomy is mandatory, depending upon one's judgment in the individual case. Incidentally, if the stricture cannot be traversed with a filiform, it is sometimes possible to achieve success with a well-oiled filiform passed through a panendoscope under direct vision. If the stricture can be traversed, it may then be possible to maintain dilatation of sufficient degree by periodic passage of sounds. If the stricture is too resistant to dilate readily, as is often the case, and is attended by chills and reactions, an internal urethrotomy should be done. Following this procedure it is permissible to insert a large indwelling catheter (26 or 28 F.) for a week to establish patency, and to follow this up at necessary intervals with sounds. In my experience, an internal urethrotomy in late cases is always better than an external urethrotomy, if it can be done. An external urethrotomy, with excision of the scar and reunion of the proximal and distal urethra on an indwelling catheter splint, may be followed by partial incontinence, and reformation of scar tissue requiring further dilatation with sounds. When external urethrotomy is indicated, the method of Pasteau, modified to suit the individual case, should be followed.

It is important to bear in mind the damaging effects of stricture of long standing on the upper urinary tract. Ascending pyelonephritis and hydronephrosis are sequelae which may result in death from urosepsis or uremia.

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JAY J. CRANE, M.D. (1921 Wilshire Boulevard, Los Angeles).—We have just listened to a well-written paper on a subject which is of great interest to all urologists, although all of us do not have the opportunity to see such a large series of cases as those just described by Doctor Beach.

The subject has been well handled, and the paper when published will command the attention of all surgeons; for nowhere in our present-day texts or even in our current literature, is there such a complete description of this subject.

Having cared for only a very small number of such patients in comparison with the large series Doctor Beach has seen, I feel that anything I may say will not lend much weight. However, I should like to emphasize the necessity of recognizing the nature of the injury early, in order that treatment may be carried out before extravasation of urine and blood is too extensive, especially in those patients who void spontaneously after the injury.

I also wish to mention that a cystogram taken at the time of the first catheterization will be of great assistance in ruling out a ruptured bladder. If after a catheter is passed, and no rupture of the bladder is found, then many of these patients can be cared for successfully with only a retention catheter; if catheterization, however, cannot be accomplished, then one should never hesitate to drain suprapubically and explore the abdomen at the same time if necessary.

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## PELVIC FLOOR AND ADJACENT VISCERA: THEIR PLASTIC SURGERY*

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DISCUSSION *by H. A. Stephenson, M.D., San Francisco; H. N. Shaw, M.D., San Francisco; R. Glenn Craig, M.D., San Francisco; L. A. Emge, M.D., San Francisco.*

A CONSIDERATION of the recent literature dealing with operations designed to correct damage to the birth canal and its supports, and to correct certain alleged pathological positions of the generative organs, leads one to believe that some of the significant factors in the statics of the female pelvic viscera are being overlooked. Certain it is that the behavior of many surgeons has been little influenced by the notable work of R. H. Paramore,[1] published almost twenty years ago.

### OBJECT OF THE PAPER

The object of this paper is to outline briefly what appears to this writer to be the salient features in several useful plastic operations upon the pelvic floor and contiguous viscera. It is not intended in any sense to give a complete description of operative technique in the operations discussed, but rather to point out what should be the common feature in the various procedures designed to produce the desired desults. Careful study of the various surgical methods described in textbooks and even more recent publications will show that credit for good results is often given to unimportant detail, while the significant factors go unstressed.

### NORMAL ANATOMIC AND PHYSIOLOGIC FACTORS

In order to discuss the mechanics of repair, it is first necessary to consider the normal anatomic and physiologic factors concerned in pelvic visceral support.[1] It is important to understand that, except for its gaseous content, the abdominal and pelvic contents represent one visceral mass which

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